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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/553,847

10/20/2005

Ikutomo Umeoka

2005_1497A

6289

52349

7590

09/21/2009

WENDEROTH, LIND & PONACK L.L.P.

1030 15th Street, N.W.

Suite 400 East

Washington, DC 20005-1503

EXAMINER

KASTURE, DNYANESH G

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

09/21/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/553,847	Applicant(s) UMEOKA ET AL.	
	Examiner DNYANESH KASTURE	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-9 and 14-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-9 and 14-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 2 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. In Re Claim 2, the claim improperly depends on Claim 1 because claim 1 is now cancelled. For the purpose of analysis, it is assumed that Claim 2 is a dependent of Claim 9.
4. In Re Claim 24, the phrase "circumferential and portion" appears to be a typographical error. For the purpose of analysis, the phrase -- circumferential land portion -- is assumed instead.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9, 2, 25, 4-6 and 14-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) and in view of Roper (US Patent 5,267,505 A) and further in view of Sintz et al (US Patent 2,702,219 A)

7. In Re claim 9, Kojima discloses a hermetic compressor (abstract) comprising a housing (1) which contains oil and houses a compression mechanism (6) for compressing a refrigerant gas, the compression mechanism comprising:

- a crankshaft (10) disposed in a vertical direction and having a main shaft (11) and an eccentric shaft (12)
- a block (16) forming a cylinder (17)
- a cylindrical piston (20) arranged to reciprocate in the cylinder (17) in a direction of a cylinder axis
- a piston pin (22, 122) disposed on the piston (20) in a way in which a center axis is in parallel to the eccentric shaft (12)
- a connecting rod (21) for connecting the eccentric shaft (12) to the piston pin, the piston pin and the connecting rod forming the connecting portion
- part of the skirt side of the piston (20) is protruded to the outside of cylinder (16, 17) in the vicinity of the bottom dead center position as depicted in Figure 5

8. However, Kojima does not disclose details of the piston surface including the recesses that the piston pin hole opens into, under cuts and the land surfaces formed as a result with configuration and form as set forth in the claim.

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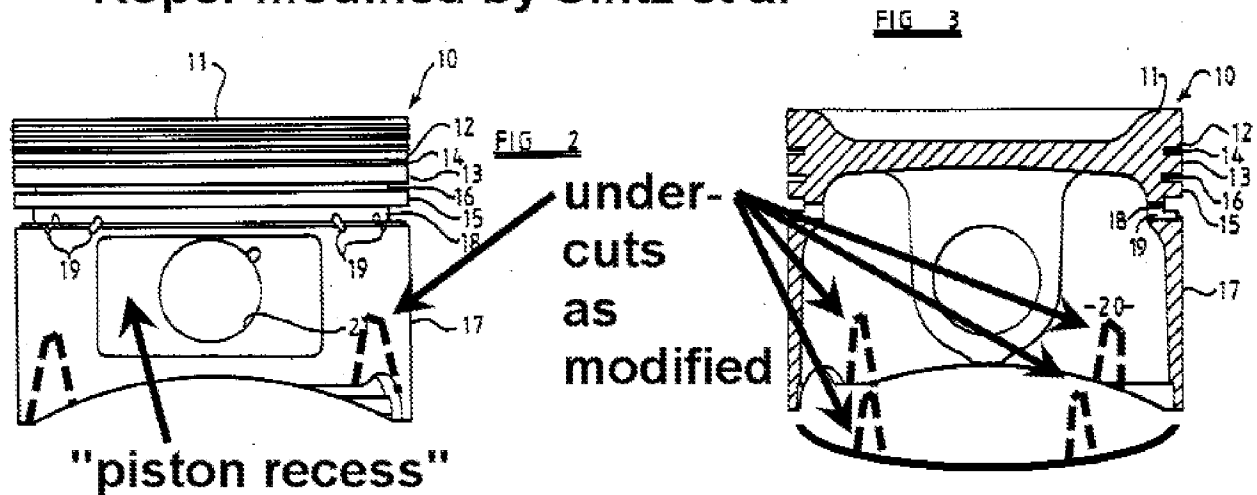
9. Nevertheless, with reference to Figures 2 and 3 depicted above, Roper discloses a piston with the following piston surface details:

- a skirt surface at the connecting portion side of the piston as depicted
- a top surface at the cylinder side of the piston as depicted
- an outer circumferential surface (having the “piston recess”) parallel to the cylinder
- a pin hole (21) formed diametrically through the piston as depicted
- a piston pin (“gudgeon pin” as stated in Column 3, Line 28)
- “piston recess” as annotated (one at each end of the piston pin hole as better identified in Figure 4) that opposite ends of the piston pin hole open into, are formed at diametrically opposite locations of said piston

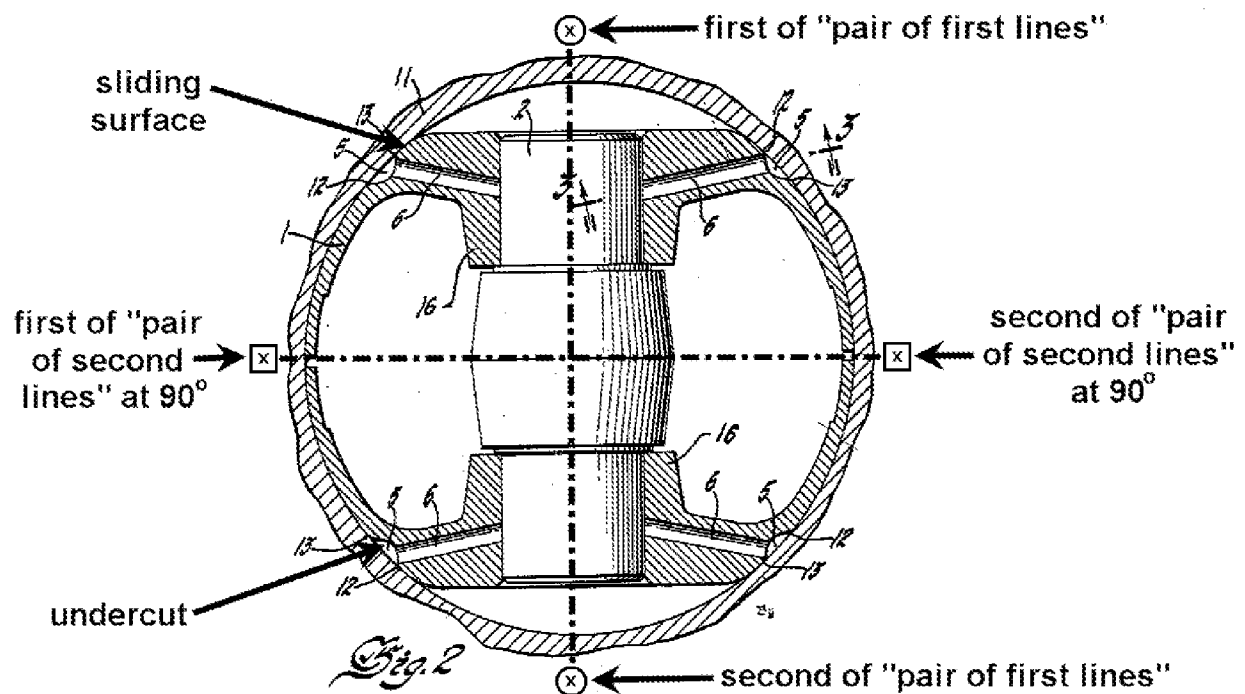
10. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use the piston of Roper in the apparatus of Kojima as a suitable design choice by one skilled in the art due to its successful application in the prior art. If the selection leads to anticipated success, it is likely the result of ordinary skill and common sense and not the product of innovation.

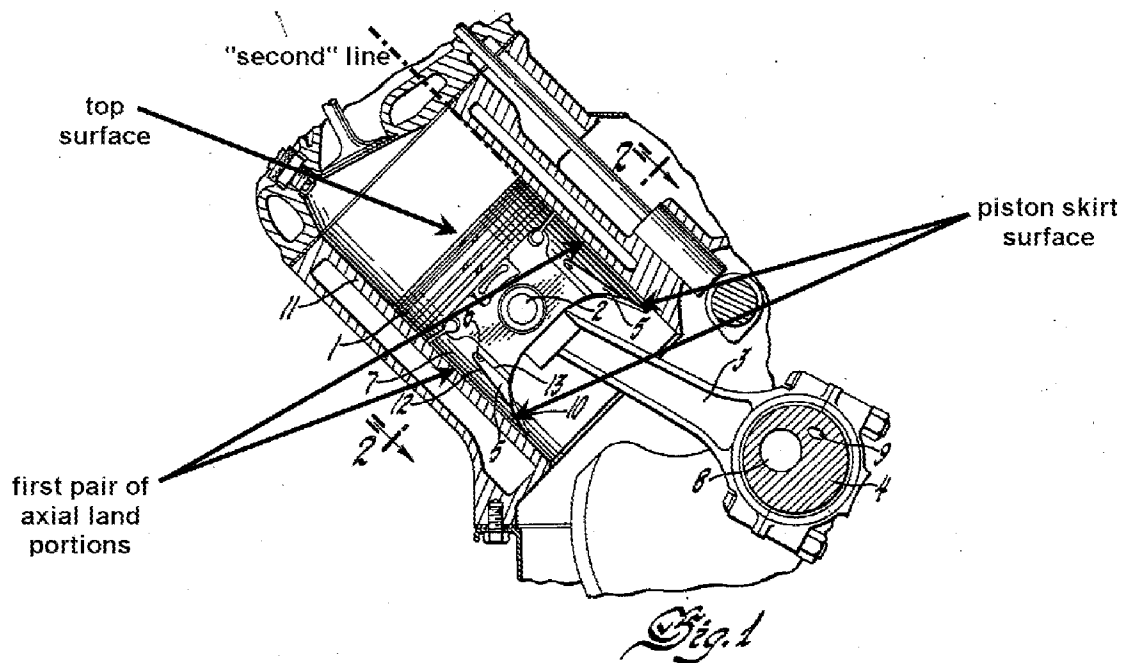
11. Kojima modified by Roper discloses all the claimed limitations except for under cuts and the land surfaces formed as a result with configuration and form as set forth in the claim.

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Roper modified by Sintz et al

12. Nevertheless, with reference to Figures 1 and 2 depicted above, Sintz et al disclose at least one under cut (5) formed in the outer circumferential surface that is recessed with respect to the outer circumferential surface:

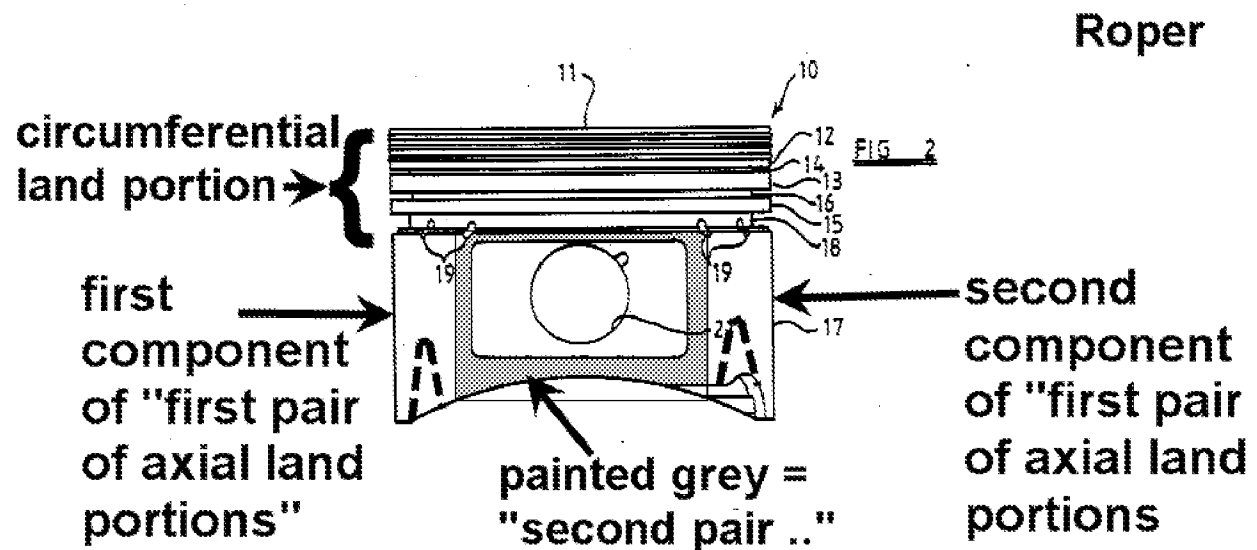




- wherein a pair of first lines (annotated) are defined at the outer circumferential surface of the piston so as to be parallel to the piston axis and so as to intersect the center axis of the piston pin, the first lines being respectively defined at mutually diametrically opposite locations of the outer circumferential surface of the piston pin with respect to the piston axis;
- wherein a pair of second lines (annotated) are defined, at the outer circumferential surface of the piston so as to be parallel to the piston axis and so as to be spaced 90° circumferentially from the first lines with respect to the piston axis, the second lines being respectively defined at mutually diametrically opposite locations of the outer circumferential surface of the piston with respect to the piston axis;

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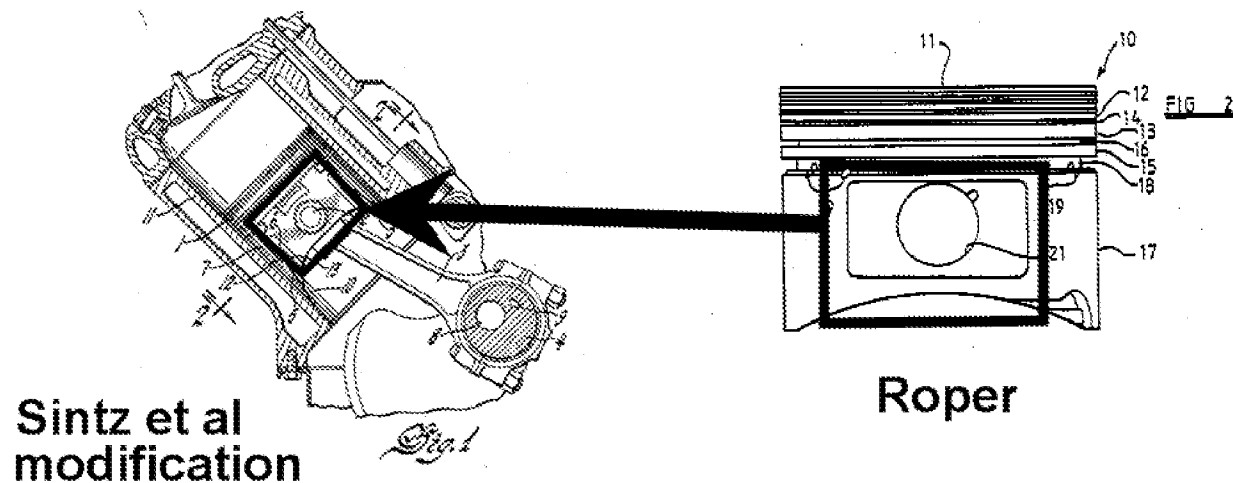
13. It would have been obvious to a person having ordinary skill in the art at the time of the invention to form four undercuts as taught by Sintz et al on the outer circumferential surface of the piston of Roper at the same position with reference to the piston pin as Sintz et al for the purpose of providing lubrication directly to the piston pin thereby ensuring that the piston pin is lubricated. With the modification, the first and second pair of axial land portions are annotated below:



As depicted, the painted grey area (there are two – one for each piston recess) denotes the second pair of axial land portions, only one component is seen because the other is on the opposite side. The only place the land is interrupted is in the area of the piston recess. The bottom of the land portion reads on "land portion disposed on one of said first lines axially between said skirt surface and a respective one of said piston pin recesses.

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14. ALTERNATIVELY, It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the portion of the piston of Sintz et al (annotated below enclosed in the rectangle) to resemble the portion (annotated below enclosed in the rectangle) of the piston of Roper thereby having a piston pin recess for the purpose of retaining extra lubricant during the discharge stroke.



15. In Re claim 2, Sintz et al depicts that four under cuts occupy a substantial area of the circumferential surface, however it does not specifically say that the undercut is no less than half the area. Nevertheless it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art - MPEP 2144.05 (II-B). Kojima modified by Sintz et al as applied to claim 9 discloses all the claimed limitations.

16. In Re Claim 25, as depicted in Figure 2 of Sintz et al, the undercuts are spaced away from each of the first and second lines. Since the undercut of Sintz et al is at the

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bottom of the piston, it is separated from the top surface of the piston and since Kojima discloses that part of the skirt is protruded outside the cylinder - the undercut communicates with the space inside the housing in the bottom dead center position.

17. In Re claim 4, Sintz et al depicts the undercut surface (5) is formed continuously to a skirt surface of the piston.

18. In Re Claim 5, Roper depicts an annular groove (14), and the circumferentially formed land has an axial width as depicted.

19. In Re claim 6, Sintz et al depicts a taper (in the area of label 10) in the boundary between the outer circumferential surface and a skirt surface of the piston.

20. In Re claim 14, since the open end of the undercut of Sintz et al is at the skirt surface, it communicates with a space outwardly of the cylinder.

21. In Re claims 15, 17, 19 and 21, Sintz et al discloses four undercuts, each spaced circumferentially away from the first and second lines.

22. In Re claims 16, 18, 20 and 22, Figure 2 of Sintz et al depicts that the four undercuts (5) are equally spaced around the circumference.

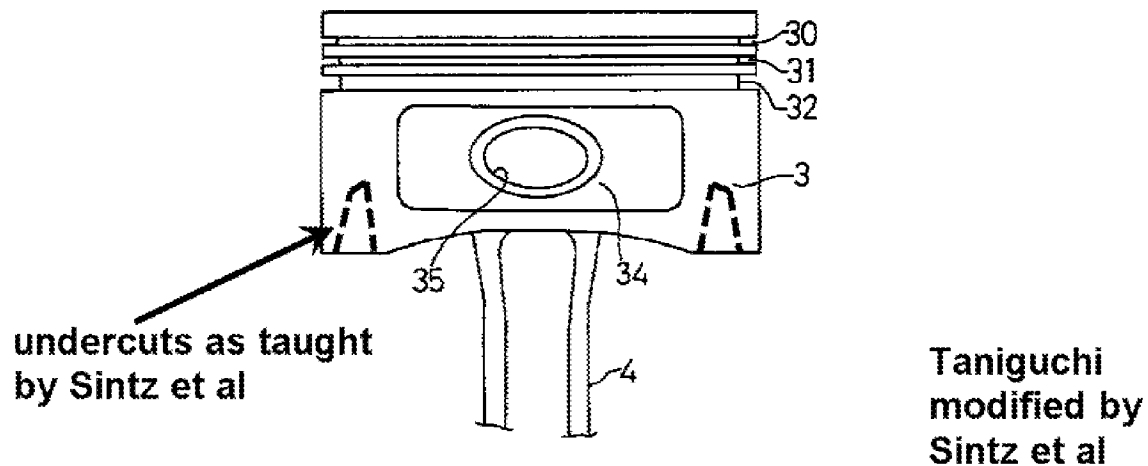
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23. In Re Claim 23, the two vertical legs of the painted portion in the above figure depicting Sintz et al's undercut modification to Roper read on the portion that extends axially continuously from the circumferential land portion to the skirt surface.

24. ALTERNATIVELY, Claims 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) and in view of Taniguchi (Japanese Patent JP 06094127 A) and further in view of Sintz et al (US Patent 2,702,219 A)

25. In Re Claim 9, Kojima as discussed earlier discloses all the claimed limitations except for piston pin recesses, undercuts and lands formed as a result.

26. Nevertheless Taniguchi as depicted above depicts the piston pin recesses.



【图4】

27. Taniguchi modified with the undercuts of Sintz et al as annotated in the Figure above in the same way as discussed earlier discloses all the claimed limitations.

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28. It would have been obvious to a person having ordinary skill in the art at the time of the invention to form four undercuts as taught by Sintz et al on the outer circumferential surface of the piston of Taniguchi at the same position with reference to the piston pin as Sintz et al for the purpose of providing lubrication directly to the piston pin thereby ensuring that the piston pin is lubricated.

29. Claims 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) in view of Roper (US Patent 5,267,505 A) and in view of Sintz et al (US Patent 2,702,219 A) and further in view of Ellermann et al (US Patent 4,599,935 A)

30. In Re Claim 3, Kojima, Roper and Sintz et al as applied to Claim 25 disclose all the claimed limitations except for an acute angle made by an edge of the undercut.

31. Nevertheless, Ellermann et al discloses an angle β that is acute as depicted which is substantially maintained around the edges of the undercut ending in the skirt surface.

32. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the edge of the undercut modification taught by Sintz et al so that the angle made by an edge of the at least one undercut with the outer circumferential surface of the piston is an acute angle as taught by Ellermann et al for the purpose of easier transition of oil from the undercut to the piston surface when collecting lubricant.

33. Claims 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) in view of Roper (US Patent 5,267,505 A) and in view of Sintz et al (US Patent 2,702,219 A) and further in view of Helt (US Patent 6,282,910 B1).

34. In Re claim 7, Kojima modified by Roper and Sintz et al as applied to claim 25 discloses all the claimed limitations except for the motor element driven by an inverter at plural operating frequencies including an operation frequency that is at least a power supply frequency or less.

35. Nevertheless Helt discloses how power at a nominal frequency from a power supply is input to an inverter which converts that power to a reduced frequency at its output which is conveyed to a motor which runs at a reduced speed - Column 5, Lines 59-65: "Power at a nominal frequency from supply 27 is applied to inputs 63 and 64 of inverter 50. Inverter 50 then converts that power to create an output of a lower than nominal frequency at inverter outputs 65 and 66, which closed contacts 56 now conveys to motor input 62. The lower frequency causes blower motor 48 to run at a reduced blower speed ..".

36. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate the inverter and reduced frequency motor operation methodology of Helt into the motor of Kojima modified by Roper and Sintz et al as a

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suitable design choice for the motor apparatus and mode of operation for the purpose of providing lower flow rates when appropriate, as stated in by Helt in Column 5, line 65.

37. Claims 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) in view of Roper (US Patent 5,267,505 A) and in view of Sintz et al (US Patent 2,702,219 A) and further in view of Numoto et al (US Patent 6,082,132 A)

38. In Re claim 8, Kojima modified by Roper and Sintz et al as applied to claim 25 discloses all the claimed limitations except for the usage of R 600 a refrigerant gas.

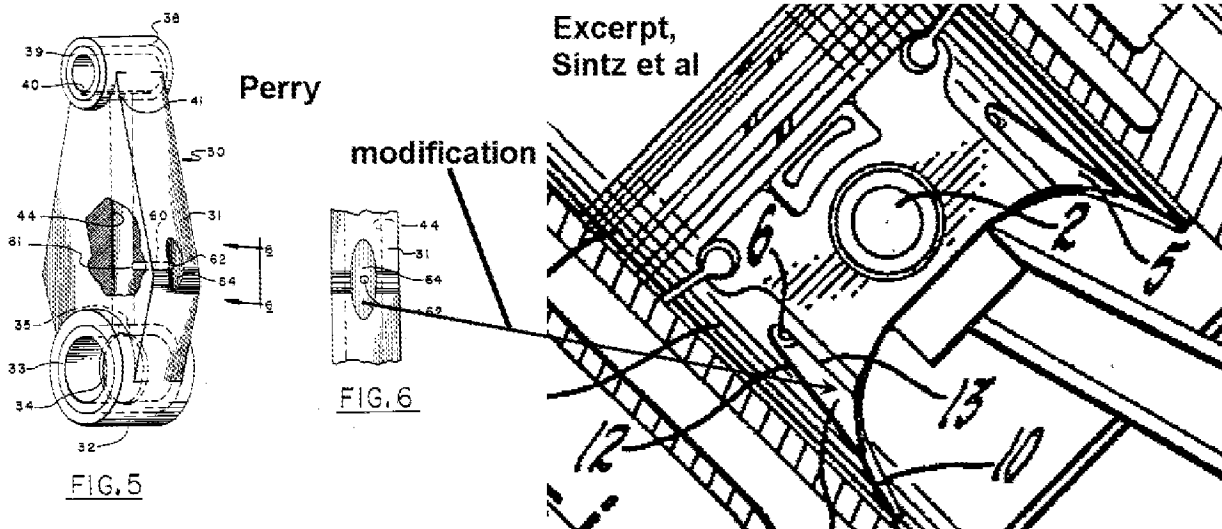
39. However, Numoto et al discloses in Column 1 line 7 that R600a refrigerant is used in a refrigeration cycle.

40. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use R 600 a refrigerant of Numoto et al in the compressor of Kojima modified by Roper and Sintz et al as a suitable design choice for a compressible medium that does not contribute to global warming and preserves the ozone layer as mentioned in Column 1, Lines15-25 of Numoto et al.

41. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) in view of

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Roper (US Patent 5,267,505 A) and in view of Sintz et al (US Patent 2,702,219 A) and further in view of Perry (US Patent 4,502,423 A)



42. In Re Claims 24 and 26, Kojima, Roper and Sintz et al as applied to Claims 9 and 25 disclose all the limitations except for the shape that widens circumferentially and then narrows circumferentially.

43. Nevertheless, Perry discloses an undercut (64) with passage (62) that is similar to the undercut (5) of Sintz et al that has a passage (6) and has a shape that, in a direction from the bottom to top of Figure 6, first widens and then narrows.

44. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the shape of the undercut of Sintz et al so that in a direction from the skirt surface toward the circumferential land portion, the shape first widens circumferentially and then narrows circumferentially as taught by Perry as an alternate design choice for the shape of the undercut because of its successful application in prior analogous art (Perry also discloses a piston and connecting rod assembly). If the

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modification leads to anticipated success, it is likely the product of ordinary skill and common sense and not the product of innovation.

45. Note that it is not clear from the specification why this feature is critical.

Applicant only pointed to the characteristics and purpose of the channels (5) of Sintz et al in applicant's response, however the criticality of the claimed feature was not explained.

Response to Arguments

46. Applicant's arguments with respect to all the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

47. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
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